LCA Center Denmark

- status and perspectives for dissemination of IPP and Life cycle thinking in Industry

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LCA Center Denmark, status and perspectives for dissemination of IPP and Life cycle thinking in Industry

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Abstract

As the first country in Europe Denmark established an official centre for Life Cycle Assessments and life cycle approaches as an element of the national IPP (Integrated Product Policy), three years ago. The aim of the centre is to promote and support the use of Life Cycle Assessment and other product-oriented environmental tools in companies, to ensure that the LCA efforts is based on a solid and scientific basis, and to maintain the well-established co-operation between all important actors in the LCA field in Denmark. A status is given on the achievements of LCA Center Denmark, and the learning that other countries can draw in support of IPP and dissemination of life cycle thinking in industry.

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Keywords

IPP, Life cycle thinking, industry

1 INTRODUCTION

Over the last decade, a product-oriented environmental policy has developed in several European countries (e.g. [1] [2] [3] [4] [5], and a coordinated Integrated Product Policy (IPP) is currently under development at the EU level [6] [7].

The tools, which are applied in the national environmental product policies and in EU's Integrated Product Policy, are typically a combination of soft regulation and support to industries who want to apply life cycle engineering. The soft regulation aims at informing consumers and other downstream stakeholders about the environmental consequences of consumption and motivate them to buy the more environmentally benign products. Green public purchase policies, leading authorities to buy the most environmentally benign products, is also a way of greening the market.

On the other hand, the soft regulation also aims at forming a level playing ground for those companies who wish to compete on the environmental performance of their products. It is thus important that the downstream stakeholders can get credible information helping to identify the most environmentally benign products. To this aim, different information systems have been developed:

- Official ecolabelling systems developing criteria for environmentally friendly products and managing the assignment of ecolabels to products (ISO 14020, Type I [8], ISO 14024 [9]).
- Official environmental product declaration system (ISO 14020, Type III [8], ISO 14025 [10]).
- Standard for self claims on environmental performance on products (ISO 14021 [11]).
- Standards for performing and using LCA (ISO 14040 series [12] [13] [14].

Table 1 lists the main tools of the integrated product policy.

Tool	Purpose
Ecolabelling system	Highlight those products which have the best performance in their product group. Example: EU Flower, Nordic Swan, German Blue Angel, ISO 14024 standard
Environmental Product Declaration system	Comparable environmental profiles of products based on a full life cycle assessment, both for business to business communication and consumer-oriented. Example: Swedish EPD system, ISO 14025 report
Standards for LCA	Transparent and reproducible life cycle assessments following the same fundamental rules at all important points. Example: ISO 14040-14043 standards
Standards for Design for environment	Disseminate good approaches to integration of environmental considerations in product development. Example ISO/TR 14062 guideline
Green public purchase guidelines	Guide public purchasers (and other) in how to take in environmental considerations when purchasing different products. Example: Green public purchase guidelines from several countries on a number of product groups (Denmark: www.miljoevejledning.dk, Norway: www.grip.no, Japan: www.gpn.jp)
Green product taxes	Promote a price structure where the price of the product reflects its environmental impact as opposed to the current situation where the cheapest products often have the largest impacts Example: Some attempts at CO_2 taxes

Table 1. Tools of an Integrated Product Policy

The implementation of life cycle engineering in industry is supported by information on the possibilities, it provides to industry and subsidies to the capacity building within this field.

A Danish initiative in the dissemination of life cycle approaches within industry has been the establishment of a national LCA Center as a knowledge centre for life cycle assessments (LCA) and life cycle thinking.

2 LCA CENTER DENMARK

The Danish LCA Center was founded 2002 as an information and dissemination instrument of the Danish IPP with the goal to

1. promote the use of Life Cycle Assessment and other product-oriented environmental tools in companies,

2. support companies and others in using environment-al assessment of products and services,

3. ensure that the effort in the LCA area is based on a solid and scientific basis, and

4. maintain the well-established co-operation between all important actors in the LCA field in Denmark.

The funding of LCA Center Denmark primarily comes from a donation of 1.2 million Euro from the Danish Environmental Protection Agency, but the Center also has other sources of income through sale of LCA software, organisation of thematic meetings and various consultancy activities.

LCA Center Denmark is managed jointly by three consultancy institutions: IPU, the Institute of Product Development, COWI consult and FORCE Technology. All three partners are major actors within the life cycle field in Denmark, and they have many years of experience in the field of life cycle assessment - scientifically as well as practically. Each partner has a member in the management board - and a person from FORCE is furthermore appointed as head of the Center to coordinate and manage the activities. On top of the management board and the head of the Center, the Danish Minister of Environment has appointed an executive committee with 7 representatives appointed among the stakeholders of the Danish LCA Center – three from industry, one from agriculture, one from academia, one from consultancy, and one from administration (the Danish EPA).

The executive committee sets the strategy for the Center within the restrictions set by the funding contract with the Danish EPA.

To collect inputs from a broader range of stakeholders, the board has furthermore appointed an ad hoc working group with approximately 45 members representing all active stakeholders in the life cycle field in Denmark. Figure 1 shows the structure of LCA Center Denmark.

As seen from Figure 1, the Danish LCA Center has a structure involving a large number of competent people and institutions. When it comes to run the multiple activities in which the Center is involved, the size of the staff is, however, very modest. No persons work full time within the Center, and the total activity for all three partners on an annual level amounts to a mere 1.5 full time employees.

In order to meet the goals, set up for the Danish LCA Center, a number of activities are carried out, and services are offered for interested companies.

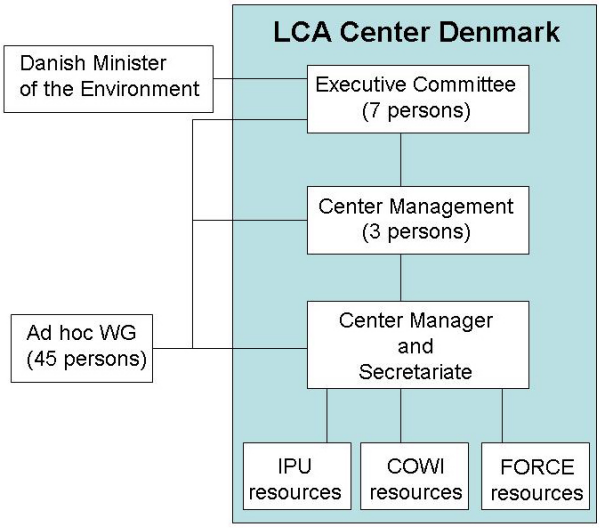

Figure 1: Organisation of the LCA Center Denmark.

2.1 Information and dissemination activities

LCA Center issues a **free newsletter** - 'LCA-nyt' ('LCA-news' – see Figure 2) which is one of the most important means of communication to the companies and persons interested in LCA and life cycle thinking. The newsletter is mainly in Danish, but to satisfy the needs of international actors, a one page summary of the most important news is included in English [15].


LCA-nyt

Nyhedsbrev
Nr 26, November 2005

I dette nummer:
- Viden om livscyklus til fremtidens designere
- Opdateret OMIT-værktøj til beregning af emissioner fra godstransport
- Møde om miljøvaredeklarationer
- Arbejde med LCA hos Grundfos har resulteret i energimærker
- LCA gør Rockwools kunder klogere

Fremtidens designere lærer om produkters livscyklus

Designere er en vigtig brik, når mindre miljøbelastende produkter skal udvikles og afsættes. Derfor er LCA Center glade for at samarbejde både med Danmarks Designskole og TEKO Center Danmark om at klæde de studerende på til at træffe miljørigtige valg i designprocessen.

LCA Centers væsentligste formål er at udbrede livscyklustankegangen til virksomhederne, så flere renere produkter kan udvikles og afsættes til gavn for miljøet.

Samarbejdet med TEKO Center (tekstildesign) og Danmarks Designskole er væsentlige brikker i en indsats, der på sigt skal føre til opfyldelse af formålet.

Designere har nemlig stor indflydelse på parametre som materialevalg og -forbrug, levetid - men kan også have direkte indflydelse på miljøbelastningen hos forbrugeren. Et stykke tøj, der kan vaskes ved lav temperatur og ikke behøver tørretumbling, kan reducere energiforbruget hos forbrugeren markant til gavn for både pengepung og miljø.

Opdateret værktøj til beregning af miljøbelastning fra godstransport

Det danske værktøj OMIT, til beregning af emissioner fra godstransport, er kommet i en opdateret 2005-version. Her er blandt andet inkluderet den nye standard for lastbilsmotorer EURO V. Værktøjet er gratis og udgives af Institut for Transportstudier.

Du kan finde værktøjet på LCA Centers hjemmeside sammen med andre praktiske værktøjer til brug, når du laver LCA. Værktøjerne findes under "Viden & Knowhow" → "Praktiske Værktøjer".

www.lca-center.dk

Institut for Transportstudier har fået et opdateret værktøj til beregning af emissioner fra godstransport.

LCA-news in English

Inside this newsletter we bring an English summary of the most important contents.

LCA Center
FORCE Technology
Hjortekærsvej 99
2800 Kgs. Lyngby

Følg med i dag-til-dag nyheder og LCA aktiviteter på LCA Centers hjemmeside www.lca-center.dk

LCA Center drives af IPU, COWI og FORCE Technology

Figure 2: LCA-nyt – the newsletter of LCA Center Denmark

The **homepage of LCA Center Denmark** is another important communication channel towards interested

users. Day-to-day news, a calendar of relevant activities, and access to tools and further information are among the most important information found at the Internet site. The primary language is Danish, but there is also an English version where topics of obvious international interest are available [15].

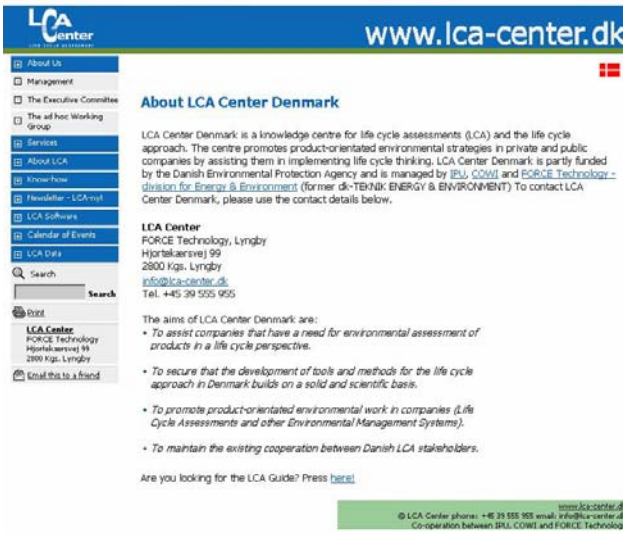

Figure 3: The homepage of LCA Center Denmark

Capacity building in Danish LCA actors lies at the core of the Center activities. A number of **courses** have therefore been offered from short introductory courses to longer modular training passes. Where possible, training is based on work with the participants' own cases trying to meet them where they are and take them to where they need to go. Topics for courses are:

• Brief introduction to life cycle thinking, IPP and LCA.

• Hands-on introduction to life cycle check (a simplified LCA tool developed for SME's and applicable in a first screening LCA).

• Greening the product - environmental considerations in product design

• Modules on specific issues within LCA, possibly as part of a larger modular eLearning course

In addition to offering courses, LCA Center Denmark stimulates and supports the **formation of networks** between LCA users with common interests for mutual exchange of interests. **Thematic seminars** covering specific topics on IPP, life cycle thinking or LCA are organised as open meetings for interested participants from industry, consultancy, authorities and academia, and the large ad hoc working group with representatives from all active Danish stakeholders (see Figure 1) is informed on new developments at meetings 2-3 times per year. Via the homepage, the Center also runs an **answering service** where LCA users can get answers from experts on their LCA-related questions.

In order to spread the interest in life cycle thinking among particularly the small and medium-sized Danish companies, LCA Center every month publishes a new **case reporting on experience with life cycle thinking in a company**, illustrating concrete benefits obtained by taking a life cycle approach [16].

2.2 LCA tools and methodology

From the early start of the Danish product-related environmental activities, there has been a strong focus on creating and maintaining a sound, transparent and scientifically justified methodological basis for evaluating the environmental impacts of products and services and for the IPP in general. This was reflected in the large methodology project Environmental Design of Industrial Products, which was launched in 1992 and which resulted in the EDIP methodology [17] [18] [19], and it has been followed up by creation of simplified methodologies [20] [21] [22] [23] [24] and update and maintenance of the EDIP methodology [25] [26] [27] [28] [29] and of the Danish Life Cycle Unit Database.

LCA Center Denmark has been given the task to coordinate the continued Danish methodological developments and support LCA users' access to tools and data through

• Maintenance and expansion of database of life cycle unit process data

• Coordination of updates of the EDIP method

• Observation, and where relevant, representation of Danish interests in international organisations working with consensus building and standardisation of LCA like UNEP, SETAC, and ISO,

• Development, distribution, and support of a software tool for modelling and assessment of environmental impacts from product systems, based on an existing tool on the market

• Distribution of simplified tools for implementing life cycle thinking in companies

The tasks and activities of LCA Center are summarised in Table 2.

Task or activity	Purpose
Propagation of information	Establishing an overview of activities and stakeholders in the field (homepage, newsletter, Danish LCA reference group).
Provide training and courses on LCA and related topics	Kick-off courses for stakeholders who are new to LCA as well as training of more experienced users with special needs.
Establishing networks of stakeholders	Bringing together key stakeholders for exchange of experience, data and possible co-operation.
Help desk for Danish stakeholders with interest in life cycle thinking	Quick answers to questions regarding LCA and related topics.
Provide software and databases on LCA	Adaptation of existing software to Danish methodology, support and recommendation on the market of software and databases for LCA and related disciplines.
Coordination of and participation in national and international LCA activities	Co-ordination of Danish stakeholders' needs and wishes for developments in the field, information to Danish users on the international developments, presentation of Danish experience in international collaborations.

Table 2: Tasks and activities of the LCA Center Denmark.

3 PERFORMANCE OF LCA CENTER DENMARK

LCA Center Denmark is evaluated continuously on performance parameters which have been defined to gauge the fulfilling of the Center's goals in a quantitative way. The evaluation is focused on:

- Newsletter – number of issues and recipients (electronic and hard copy)
- Homepage – number of news, hits, sites linking to it
- Answering service – number of answers per month
- Thematic meetings – number of meetings and participants, number of presentations to members of LCA networks

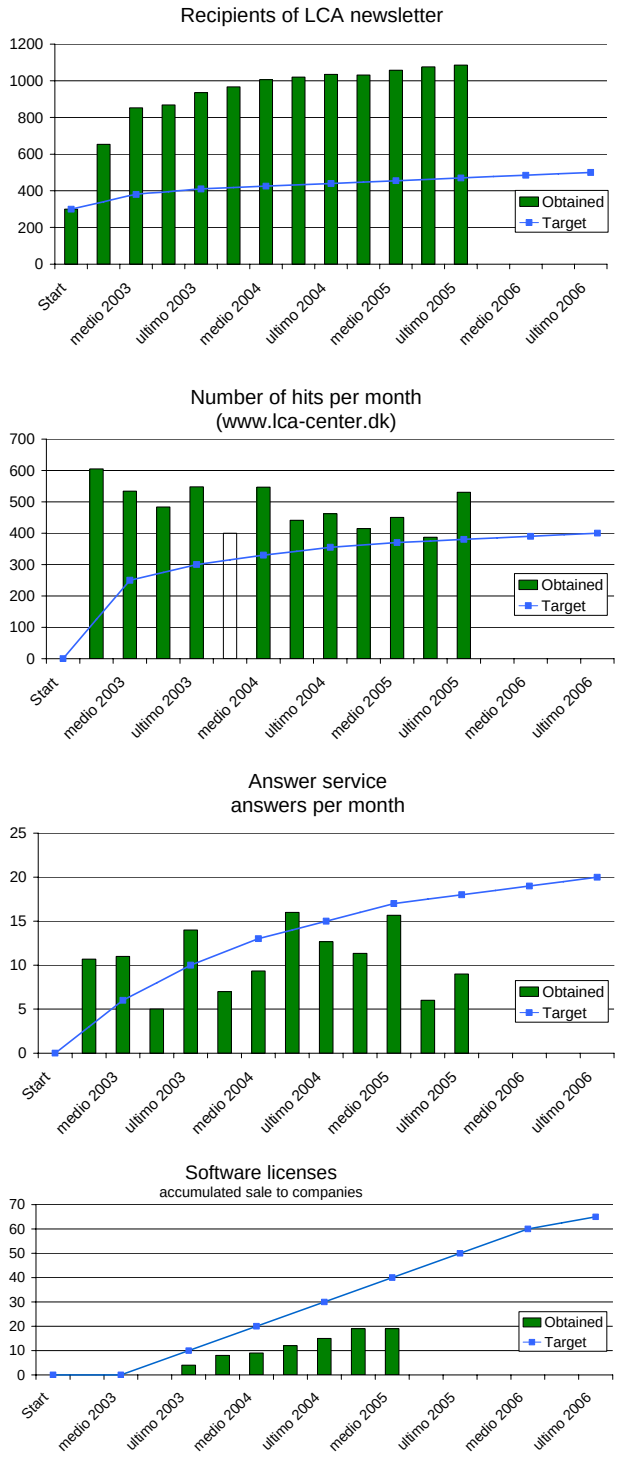

Figure 4: Performance of LCA Center Denmark on selected parameters

- Income from user-paid activities
- Number of articles and conference presentations on LCA and life cycle thinking
- Software – number of licences sold, introduction courses held.

In addition to the continuous evaluation, for which some of the results are shown in Figure 4, a midterm evaluation was carried out by an external institute in 2004 to provide a more in-depth assessment of the performance and results of LCA Center Denmark and to collect recommendations on how the performance could be further improved [30]. The midterm evaluation was based on questionnaires filled in by existing users (selected among the receivers of the newsletter) and by potential users, followed by interviews with selected respondents and focus group interviews with private companies, public institutions and organisations.

Some of the most important recommendations from the midterm evaluation were

- Continue the newsletter and homepage – they provide a user-friendly and quick way of being updated on the life cycle area
- The image of LCA Center is too technical and expert-oriented for many LCA users among companies
- Dissemination of life cycle thinking must be based on economic arguments, not environmental arguments – show good examples
- LCA and life cycle thinking should be more integrated in teaching at all levels from primary school to university.

LCA Center Denmark's organization of courses for dissemination of life cycle thinking and competence building among users of life cycle approaches has not been a success. Due to lack of participation, the only courses that have had sufficient participants to be carried out are the LCA Software courses which are given in relation to the sales of the LCA software.

The ad hoc working group with representatives of all stakeholders within the life cycle area in Denmark concludes that there is a need for a knowledge center like LCA Center to promote life cycle assessments and life cycle thinking. In the current business situation, supply of data for LCA and provision of illustrative and inspiring case stories are some of the most important tasks for such a Center to succeed in spreading the use of life cycle approaches and fulfilling the needs of the users.

4 FUTURE OF LCA CENTER DENMARK

The public funding of LCA Center Denmark expires in September 2006.The three partners behind the Center currently negotiate the conditions for a self-sponsored continuation with the Danish EPA. It is clear, that only the most cost-effective activities can be continued without public funding, and that a larger degree of user-payment will be required for some of the services provided by the Center. It is thus foreseen that the homepage and the newsletter will continue to be central activities of LCA Center Denmark together with the sale and service of PC tools for LCA.

Courses were one of the activities where the Danish EPA had high expectations for a net income for the LCA Center with a view of future financial independency. However, the midterm evaluation, backs the experience of the Center that there is not really a demand for courses within the current business environment, where Danish Companies have cut down costs that are not directly related to the production. This has had a negative influence on long

term activities like sustainable development, but also competence-building activities have been weak.

Also when it comes to software sales, the financial expectations from the Danish EPA were high. The experience shows, however, that handling a database and an LCA software is very time-consuming, and it has not been possible to gain a real net profit from these activities, which means that the financial independent future of the LCA Center Denmark can also not be based on activities like software and database sales.

5 CONCLUSION

Denmark has been one of the pioneering countries in the implementation of an Integrated Product Policy. The Danish authorities have supported the dissemination of life cycle approaches using most of the IPP tools shown in Table 1 together with method development and subsidies for companies wishing to work with life cycle approaches. LCA Center Denmark has worked with the dissemination of these many possibilities and the question remains, which lessons other countries can learn from the experience of using the Danish LCA Center as a tool in a national IPP.

Most of the activities carried out by LCA Center Denmark will also be relevant in other countries working with IPP, and the evaluations of the LCA Center may be interpreted into recommendations to other countries with due consideration of the differences from the national to the Danish setting.

Another lesson to be learnt is the essentiality of some kind of public funding for an efficient dissemination activity. It is very difficult to have users pay the actual costs of these activities as long as the market does not reward green products and services better. This is particularly the case when the industry is composed mainly by small and medium-sized companies, many of which operate in a rather short time-perspective, since the general feeling seems to be that sustainability issues are important, only not right here and now but rather more in a strategic perspective.

Industry can be motivated by legal requirements forcing them to take interest in the life cycle of their products, but today, there are only few examples of hard legislation of this kind. The most obvious example in the EU is a directive under development, setting requirements for eco-design of electrical and electronic equipment (EEE) before marketing on the European market [31]. This upcoming directive is the first (hard) legislative requirements on life cycle assessment of products within the EU. Another example of hard regulation with relevance to the environmental performance of products is the end-of-life-vehicle directive [32] which extends producer liability for vehicles to their disposal stage thus motivating product developers to design vehicles that will be easily dismantled, contain less problematic substances, weigh less and be easier to repair and upgrade – in short: to design and construct products with their disposal in mind.

Within the field of electrical and electronic equipment (EEE), directives on waste of EEE (the WEEE directive, [33]), and on restrictions on the use of some hazardous substances in EEE (the RoHS directive, [34]), have recently been adopted. The WEEE directive follows the line of the end-of-life-vehicle directive by extending producer's responsibility for the product beyond the gate.

In the absence of efficient sticks in the form of more hard legislation, the soft regulation in the form of IPP generally represents an insufficient carrot to motivate industry to develop and market greener products. The Danish experience shows that the effect of IPP alone is limited for most product types, particularly for the small and medium-sized companies. A final lesson to be learnt from the Danish experience thus seems to be that for most product types, hard legislation is needed to help the propagation of life cycle thinking – establishing a national LCA Center does not do it alone.

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